CLAIMS

1. An apparatus comprising:

a first circuit configured to (i) generate a first motion vector for a block at an integer-pel resolution and (ii) determine a single block size associated with said first motion vector; and

a second circuit configured to (i) generate a plurality of second motion vectors at a sub-pel resolution by searching proximate said first motion vector using said single block size and (ii) determine a motion vector for said block as a particular one of said second motion vectors best matching a plurality of reference samples.

2. The apparatus according to claim 1, wherein said second circuit comprises a plurality of processing elements each configured to generate a difference value by calculating an absolute difference between a first sample from said block and a second sample of said reference samples substantially simultaneously.

3. The apparatus according to claim 2, wherein said second circuit further comprises an accumulation circuit configured

to generate a sum value by calculating a sum of absolute differences from said difference values.

4. The apparatus according to claim 3, wherein said second circuit further comprises a circuit configured to generate a motion vector by storing a lowest sum value from a plurality of searches at said sub-pel resolution.

5. The apparatus according to claim 4, wherein said plurality of processing elements form a three by three array.

6. The apparatus according to claim 1, wherein said second circuit further comprises a memory configured to store said reference samples received from said first circuit.

7. The apparatus according to claim 6, wherein said second circuit further comprises a shifter circuit configured to barrel-shift said reference samples read from said memory.

8. The apparatus according to claim 7, wherein said second circuit further comprises a first interpolation circuit

configured to generate additional reference samples at a half-pel resolution by interpolating said reference samples received from said shifter circuit.

9. The apparatus according to claim 6, wherein said second circuit further comprises a second interpolation circuit configured to generate more reference samples at a quarter-pel resolution by interpolating said reference samples received from said first interpolation circuit.

10. The apparatus according to claim 7, wherein said shifter circuit is further configured to shift each of a plurality of columns of said reference samples received from said memory to align with seven outputs.

11. A method for generating a motion vector for a block, comprising the steps of:

(A) generating a first motion vector at an integer-pel resolution;

(B) generating a plurality of second motion vectors by searching proximate said first motion vector at a sub-pel

resolution using a single block size associated with said first motion vector; and

(C) determining said motion vector for said block as a particular one of said second motion vectors best matching a plurality of reference samples.

12. The method according to claim 11, wherein step (B) comprises the sub-step of:

generating a plurality of third motion vectors at a half-pel resolution by searching proximate said first motion vector.

13. The method according to claim 12, wherein searching proximate said first motion vector is performed with said single block size.

14. The method according to claim 12, further comprising the step of:

interpolating said reference samples to said half-pel resolution prior to generating said third motion vectors.

15. The method according to claim 12, wherein step (B) further comprises the sub-step of:

determining a half-pel motion vector as a particular one of said third motion vectors best matching said reference samples.

16. The method according to claim 12, wherein step (B) further comprises the sub-step of:

generating said second motion vectors at a quarter-pel resolution of said sub-pel resolution by searching proximate said half-pel motion vector.

17. The method according to claim 16, wherein searching proximate said half-pel motion vector is performed using said single block size.

18. The method according to claim 16, further comprising the step of:

interpolating said reference data to said quarter-pel resolution prior to generating said second motion vectors.

19. The method according to claim 11, further comprising the step of:

determining said single block size as part of generating said first motion vector.

20. A circuit comprising:

means for generating a first motion vector for a block at an integer-pel resolution;

means for generating a plurality of second motion vectors by searching proximate said first motion vector using a single block size associated with said first motion vector at a sub-pel resolution; and

means for determining said motion vector for said block as a particular one of said second motion vectors best matching a plurality of reference samples.